

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-079623  
 (43)Date of publication of application : 24.03.1998

(51)Int.Cl.

H01Q 23/00  
 H01L 27/00  
 H01Q 1/32  
 H01Q 13/08  
 H03H 9/02  
 H03H 9/10  
 H04B 1/18  
 H04B 1/26  
 H04B 1/38  
 // H01L 27/01

(21)Application number : 08-231685  
 (22)Date of filing : 02.09.1996

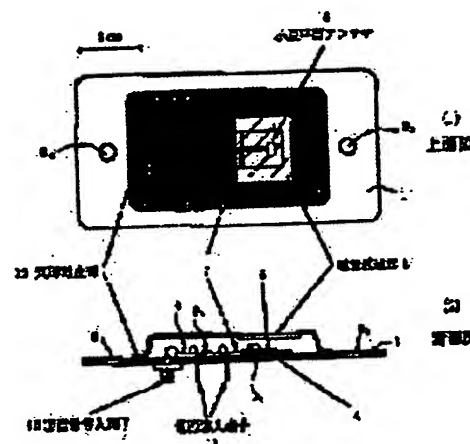
(71)Applicant : OLYMPUS OPTICAL CO LTD  
 (72)Inventor : YAMAMOTO TOSHIO  
 HIRACHI YASUTAKA

## (54) SEMICONDUCTOR MODULE INCORPORATED WITH ANTENNA ELEMENT

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a semiconductor module incorporated with an antenna element suitable for millimeter waves and quasi millimeter waves by providing a means for airtightly sealing the antenna element, an amplifier circuit and a frequency conversion circuit formed on the substrate in common space.

**SOLUTION:** An antenna element 5 is formed on a dielectric substrate 4 oppositely to an electromagnetic wave transmitting window 2 formed on a seal cover. A plane antenna such as patch antenna and a slot antenna is used for the element 5. Semiconductor integrated circuits 6, 7 on which a microwave circuit and a millimeter-wave or quasi millimeter wave circuit constituted of an amplifier circuit and a frequency conversion circuit are respectively integrated are formed on another semiconductor substrate different from the substrate 4. The substrate and the substrate 4 are arranged on one common side a substrate 1. The seal cover consisting of a conductive material is welded or screwed with/into the substrate 1 on an airtight sealing part 12 formed on its peripheral part so as to be stuck to the substrate 1 to airtightly seal the substrate 4.



## LEGAL STATUS

[Date of request for examination]

07.07.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

<http://www19.ipdl.jpo.go.jp/PA1/result/detail/main/wAAAt.a4bODA410079623P1.htm>

9/12/2003